

5-2 Students will demonstrate an understanding of relationships among biotic and abiotic factors within terrestrial and aquatic ecosystems. (Life Science)

Key Concepts:

Cell Structures: cell membrane, cytoplasm, nucleus, vacuole, cell,

Composition of an Ecosystem: biotic, abiotic; biosphere, communities, organisms, populations, terrestrial, aquatic, estuaries, saltwater marsh, herbivores, carnivores, omnivores, microorganisms, termites, worms, fungi, predators, prey, parasites, hosts, limiting factors

Supporting Content Web Sites

An Educator's Guide to Folly Beach, SC

<http://oceanica.cofc.edu/An%20Educator%27sl%20Guide%20to%20Folly%20Beach/guide/default.htm>

This site highlights the flora and fauna of Folly Beach, serving as a coastal field guide.

5-2.2, 5-2.3

Canterbury Environmental Education Centre: Nature Grid

<http://www.naturegrid.org.uk/>

The reserve is a fine example of how a former industrial site (gravel pit) has been reclaimed and enhanced to provide a variety of habitats. Virtual and interactive tours of grasslands, woodlands, ponds, and rivers are featured.

5-2.3

Florida Museum of Natural History: Habitats of Florida

<http://www.flmnh.ufl.edu/fish/southflorida/pisces.html>

This site highlights the aquatic habitats (and their surrounding terrestrial ones) of Florida through vivid photographs and basic but informative text.

5-2.2, 5-2.3

Living Things: Ecosystems and Habitats

<http://www.fi.edu/tfi/units/life/habitat/habitat.html>

This site contains information about different types of ecosystems. It contains a multitude of links for deeper information on distinguishing between ecosystems, habitats, and biomes.

5-2.2, 5-2.3, 5-2.4

Cells Alive!

<http://www.cellsalive.com/>

Award-winning, interactive site devoted to cell images and processes. The home page encourages use of the images for educational use.

5-2.1

Sea Birds, Forage Fish and Marine Ecosystems

http://www.absc.usgs.gov/research/seabird_foragefish/index.html

This site covers a wide variety of research on seabirds, fish, marine mammals, and marine ecosystems, with emphasis on factors influencing marine animal populations, such as oil pollution, fisheries, and natural changes in the marine environment.

5-2.2, 5-2.4, 5-2.5

Estuary Live

<http://www.estuarylive.org/>

Estuary Live presents live Internet feeds from the Rachel Carson Reserve in Beaufort, NC. Students and educators can e-mail questions during the broadcasts and get immediate response.

5-2

Science and Technology Focus

<http://www.onr.navy.mil/focus/ocean/>

An interactive site designed to expose students and teachers to the elements of oceanography. It features a "Cyberscientist" to whom students can conveniently submit questions by e-mail. It includes sections on habitats, sea life, ocean regions, tides, currents, and waves.

5-2.3

Schoolweb: Environmental Sciences

<http://schoolweb.se/>

Students and teachers across the globe analyze nearby woodland or wetland areas. They look at the state or health of the area, add their data by mail to a database and examine regional, national and/or global differences.

5-2.3

Suggested Literature

Arnosky, J. (2004). *Following the Coast*. Harper-Collins Publishers.

See the eastern coastline of the United States through the eyes of the author, who is a naturalist, fisher-man, boatman, and avid wildlife watcher. Sparkling illustrations and vivid descriptions will transport the reader to the seaside.

ISBN 0-688-17117-6

Lexile: AD1070L

5-2.3

Batten, M. (2003). *Aliens From Earth: When Animals and Plants Invade Other Ecosystems*. Atlanta, GA: Peachtree Publishers, Ltd.

This book is an introduction to exotic invasives describing the devastating consequences of a dozen accidental introductions: the rabbit to Australia, the mosquito to Hawaii, starlings, gypsy moths, zebra mussels, fire ants, kudzu, and Africanized honeybees to the continental United States, and Caulerpa in the Mediterranean Sea.

ISBN 156145236X

Lexile:1070L 5-2.4

Gow, M. (2005). *Great Minds of Science: Rachel Carson -- Ecologist and Activist*. Berkeley Heights, NJ: Enslow Publishers, Inc.

This biography is really four stories in one, highlighting Carson's childhood, education, the impact important people of her life, and her activism. The book is written on an upper elementary to middle school level.

ISBN 0766025039

5-2

Hinshaw Patent, D. (2004). *Garden of the Spirit Bear: Life in the Great Northern Rainforest*. Clarion Books.

This book describes a unique northwestern rain forest inhabited by a type of black bear referred to as the "spirit bear." Beautiful illustrations depict the relationships among the trees of the forest, salmon, and bears that are threatened by modern logging techniques such as clear-cutting.

ISBN 0-618-21259-0

5-2.3, 5-2.4

Hinshaw Patent, D. (2002). *Life in a Grassland*. Minneapolis: Lerner Publications.

This book describes features of grasslands, including location, variety of grasses, climate, soil characteristics, and animal life. The impact of people on a prairie ecosystem is also discussed.

ISBN 0-8225-2139-3

5-2.2, 5-2.3

Johansson, P. (2004). *The Temperate Forest: A Web of Life*. Enslow Publishers.

The author takes the reader on a journey through a temperate forest, providing a glimpse of the plants and animals found there and the interactions between them that create food webs. The author also describes how energy flows through this biome.

ISBN 0-7660-2198-X

Lexile: 950L

5-2.2, 5-2.3

Morgan, S. (2006). *Life Science In Depth: Cells and Cell Function*. Chicago: Heinemann Library.

Cells and Cell Functions not only has wonderful explanations and pictures of different types of cells and cell organelles in plant and animal cells but also it does an excellent job of explaining the cloning of "Dolly" the sheep.

ISBN 1403475202

5-2.1

Parker, S. (2005). *Amazing World of Microlife: Microlife That Lives in Soil*. Chicago: Raintree Publishers.

This book explores bacteria, fungi, and insects through great photos and clear text. Complicated concepts like decomposition, recycling, food chains, reproduction, and adaptation are accurately explained using concrete examples and simple language.

ISBN 1410918467 5-2.2, 5-2.4

Rapp, V. (2003). *Life in a River*. Minneapolis: Lerner Publications Co.

This well-written text explores the water cycle, food webs, and the log jams, steps, and eddies that all contribute to the health of Columbia River Basin ecosystem. Primary consumers and producers are discussed in the text.

ISBN 0822521369

5-2.3, 5-2.4

Webb, S. (2004). *Looking for Seabirds: Journal from an Alaskan Voyage*. Houghton Mifflin Company.

Using the format of a scientist's notebook, the author describes how she worked with researchers to understand the birds that inhabit the Aleutian Islands of Alaska. The author looks at how these birds survive and the importance of understanding the possible impact of human activities on the Arctic marine ecosystem.

ISBN 0-618-21235-3

Lexile: 1020L

5-2.3

Suggested Streamline Video

Biology: The Science of Life: Ecosystems: The Role of Abiotic Factors. United Learning. (2003). Retrieved July 8, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>

This fifteen-minute program examines the role of non-living, abiotic factors and the role they play in shaping ecosystems. Five abiotic factors are examined: water, air, soil, heat, and light.

0:00-15:00

5-2.2

Biology: The Science of Life: Ecology: Organisms in Their Environment. United Learning. (2003). Retrieved July 8, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>

This program examines the interactions between organisms in their environments. The concepts of ecosystem, population, niche, food chain, food web, food pyramid, and the carbon cycle are all explained.

0:00-10:02 5-2.2, 5-2.4

Food Chain Mystery, The. 100% Educational Videos. (2000). Retrieved July 8, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>

Vivid animations using a linear food chain and an energy pyramid show how energy passes through the food chain, including predator-prey relationships, herbivores, carnivores, and omnivores.

0:00-15:00

5-2.4

Living Cell, The. 100% Educational Videos. (2003). Retrieved July 8, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>

Two students enter an impromptu game of "cell-ebriety squares" to learn about the structure and functions of plant and animal cells, with help from knowledgeable "cell-ebrities," and actual cell footage.

0:00-9:27 5-2.1

Elementary Video Adventures: Habitats of the World. Discovery Channel School. (1999). Retrieved July 8, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>
Saltwater marshes, temperate forests, grasslands, and tropical rainforest are featured in different segments in this video.

0:00-30:37

5-2.3

TLC Elementary School: Earth's Energy. Discovery Channel School. (2004). Retrieved July 8, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>
Segment14: *Producers, Consumers, and Decomposers*

Illustrates the relationships among these life-forms and explains why a balance is necessary for the survival of the biosphere.

0:00-4:39

5-2.4

Enviro-Tacklebox: Module 5: Processes and Cycles in the Environment: Behind the Numbers. Louisiana Public Broadcasting. (2003). Retrieved July 9, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>

"Behind the Numbers" links population fluctuations to changes in various abiotic and biotic factors.

0:00-20:11

5-2.5

Freshwater Wetlands: Lakes, Ponds, and Pools. Environmental Media. (2001). Retrieved July 9, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>

The wetlands habitats featured in the series include prairie potholes, beaver ponds and southern cypress swamps. The programs provide detailed information about each system's natural processes and representative flora and fauna.

0:00-10:00

5-2.3

Oceans Alive: The Salt Marsh. Environmental Media. (1990). Retrieved July 9, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>

It's a place that's not quite land and not quite water. Large numbers of living things are found here, but only a few different species are equipped to survive here.

0:00-5:00

5-2.3

Life of a Forest, The: A Forest Grows Old. United Learning. (1993). Retrieved July 8, 2006, from unitedstreaming: <http://www.unitedstreaming.com/>

This lesson defines the terms carnivore, herbivore, and omnivore, and examines the conditions, such as weather and populations, that affect the evolution of the forest.

0:00-20:40

5-2.3, 5-2.4, 5-2.5

Career Connections

Marine Biologists study what controls the numbers and kinds of plants and animals in the marine environment. They are interested in how marine organisms develop, relate to one another, adapt to their environment, and interact with it. Their work may examine how underwater acoustics affect fish and marine mammals, how some animals use Earth's magnetic field to navigate, or how marine plants and animals respond to pollution. To accomplish their work they may use field observations, theoretical and numerical modeling, laboratory experimentation, and field experimentation. Some estimate that the oceans contain millions of species yet to be discovered.

Fisheries Scientists or Fisheries Managers manage fish populations in reservoirs, lakes, rivers, oceans, and aquaculture facilities to assure that they are not over fished or otherwise adversely affected.

Aquatic Biologists study the biological, chemical, geological, optical and physical characteristics of inland fresh and salt water systems--lakes, rivers, streams, ponds, and wetlands.

Ecologists study the relationships between living things and their environment. Ecologists often have to study and explain how human actions affect other living things and their environment. They can be teachers or research scientists.

Microbiologists study the world of organisms that are too small to be seen with the naked eye. Some of these microorganisms are infectious agents to humans, animals, or plants. Many of these microorganisms, however, carry out important functions in their niches that are essential for all life on earth. Microbiologists study the interaction of microorganisms with people and how they affect our lives, as well as the roles these organisms play in the environment. Microbiologists work in hospitals, universities, medical schools, government laboratories, and almost every industry, specializing in a variety of areas, from agriculture to the space industry.